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ABSTRACT

This paper describes strategies for successful management information system (MIS) development, and an application of these strategies to the Benjamin Rose Institute, a community agency serving the frail elderly in Cleveland, Ohio. A definition of MIS is followed by a list of symptoms of systems which indicate a need to review current methods of information gathering and reporting. Design considerations are discussed including: (1) assigning a coordinator; (2) tailoring MIS to the organization's needs; (3) communicating with and involving the staff; (4) keeping the system simple, practical, and flexible; (5) designing and implementing incrementally; and (6) replacing an outmoded system. Expected results of MIS design are also discussed. A description of the application of MIS at the Benjamin Rose Institute includes the purpose of the institute, its operation prior to MIS implementation, MIS planning considerations, and phases of the design process, as well as results and conclusions. Nine references are provided. (RBF)

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INFORMATION SYSTEM DESIGN AND IMPLEMENTATION:

Strategies for Success

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Every human services organization has an information system, be it implicit or defined, simple or sophisticated, manual or automated. However, not every information system efficiently provides managers with the information needed for effective planning and agency administration, or to respond to the increasing and changing requirements for accountability and program justification. Consequently, an awareness of the need for improved systematic information gathering and reporting has developed and has led managers to consider or to attempt designing the ultimate "management information system (MIS)."

There is no single, ideal approach to MIS design, given the uniqueness of each organization. There are, however, general design strategies, applicable in any setting, which assure a greater likelihood of success. The intent of this paper is not to provide technical assistance for design, but to identify strategies for successful MIS development and to present a practical application of these strategies: an MIS recently implemented within a community agency serving the frail elderly.

WHAT IS AN MIS?

Definitions of "Management Information System" often seem to equate "management" with "administration," emphasizing the importance of the system's output in overall organizational planning and decision-making. Whereas this is a fundamental objective of an MIS and is likely to provide the impetus for system revision, other staff should not be overlooked in their roles as "managers." Line staff, for instance, require organized data to effectively manage their cases.

An MIS is a management tool; a well-designed system will facilitate planning, evaluation and decision-making on a variety of levels, from

the case level, to the program level, to the agency and perhaps, community level. More specifically, an MIS is "a mechanism for turning data into information which provides support for the manager who must turn the information into decisions and plans" (Paton & D'huyvetter, 1980, p. 1). It is "any system of people, equipment, documents, procedures and communications which gathers, stores, processes and presents information for the purpose of assisting managers with a variety of managerial functions" (Hagedorn et al, 1976, p. 73).

Basically, an information system consists of inputs, that is, data which are fed into the system, data processing, through which data are aggregated to yield meaningful information and outputs, generally in the form of reports. Procedures to control the flow and accuracy of inputs and outputs tie the system together.

An MIS is not a computer and, in fact, need not be computerized at all. An MIS is neither a problem-solver nor a decision-maker. As stated by Chapman (1976) and Cohen, Noah and Pauley (1979), reports generated by the system merely reflect what is going on in an agency and must be viewed simply as a point of departure in the decision-making process.

IDENTIFICATION OF NEED AND ORGANIZATIONAL READINESS

Symptoms indicating a need to review the current methods of information gathering and reporting are highlighted below.

a. The current system is unable to generate the information required by management or by funding sources for planning and accountability.

b. Information is inaccessible, that is, the required data exist, but the retrieval process requires inefficient use of time and manpower.

c. Each of different components of the operation, especially those which perform the same function, has a different information system in place.

d. Agency policies, objectives or programs are changed, but the design of the present system was based on the previous philosophies.

e. A form is designed for every need that arises; paperwork has become unmanageable.

f. Duplication in recording and reporting is considerable.

Merely identifying that the current system needs revising does not assure that a review will ensue or that recommended changes will be implemented. A supportive organizational climate must exist: management must acknowledge and understand the need for objective data for resource allocation and for monitoring the activities of the agency. As such, management must be willing to invest the time and resources required, both of which could be considerable, in system development, and must provide ongoing support. In addition, the timing of this change must be carefully considered in light of other changes about to be implemented, to assure that it can be successfully absorbed.

DESIGN CONSIDERATIONS

Lowe and Sugarman (1978) summarized the results of hasty system design as follows:

a. The data collected were not the data needed;

b. reports were difficult to interpret and, were therefore, meaningless;

c. the system was inflexible - it could not meet new external requirements that arose;

d. reports were of little use internally as they did not contribute to management decision-making;

e. too much staff time was spent on increased paperwork, which reduced the time available for services;

f. erroneous data were entered into the system.

Whereas any system will have associated costs, one through which few benefits are realized will prove especially expensive. Careful, detailed planning, followed by testing and revising, is a must. Design considerations which might prevent the above results are discussed below.

1. Assign a Key Person to Coordinate the Process

In their review of literature pertaining to human services information systems, Bowers and Bowers (1977) found that the success of a system is highly influenced by the presence of a key person, that is, someone motivated to see the project through to completion and to achieve positive results. Although much of the planning may be accomplished through committees, task forces and systems consultants, one individual to oversee these efforts is important for continuity of system development.

Recommended qualities for this individual, as described by others, include statesman, sociologist, politician, psychologist (Kupfer, Levine & Nelson, 1976); trust-building ability, ability to stay cool under pressure (Quinn, 1976); an understanding of both programs, i.e., the service delivery process, and systems; a willingness to compromise and acceptance and respect within the organization (Bowers & Bowers, 1977). This individual must be able to communicate with and motivate all levels of staff, since one role is that of liaison between line staff and Administration, as well as between human services staff and technical, systems people.

The key person will continually be involved in analyzing the information needs of all organizational levels and in monitoring the flow of input and output. Once operational, the system will require someone to make sense of and present the data, to recognize flaws, to resolve MIS-related problems and to suggest and implement enhancements. Should the agency opt for computerization, this individual would be the logical coordinator of the system conversion.

2. Tailor the MIS to the Needs of the Organization

The temptation to adopt, without modification, the information system of another agency should be resisted, regardless of the degree of similarity between the agencies. What works in one environment is likely to fail in another, due to political, personnel and resource variances. Although valuable lessons can be learned through studying other systems, a responsive MIS must be tailored to the unique needs of the organization. To this end, the planning should begin with top management explicating the objectives of the system and defining the agency's information needs, including the desired outputs.

One approach to this process is to identify specific questions which the MIS should address, to prioritize these questions and to identify the data required to respond to them. Since objectives, priorities and personnel change over time, the process of investigating information needs must be ongoing.

3. Communicate with and Involve All Levels of Staff

As the design process progresses, the importance of communicating with and involving all levels of staff, including clerical, cannot be overemphasized. Soon after the go-ahead for system revision has been issued and information requirements have been defined, staff should be informed of the plans. The system's objectives should be clearly communicated and, if possible, staff should be made aware of how and when the changes will affect them.

The system designer's greatest resource is the expertise of the staff who will be preparing the inputs and working with the system on a day-to-day, client-by-client, basis. This expertise must be tapped, through formal and informal mechanisms, to uncover the current methods of operation and to identify both efficient and inefficient procedures, to define worker and office informational needs and to assist in streamlining forms and procedures. With the input of staff, forms may be designed to serve not only as inputs to the total information system, but also as outputs to the worker, for example, by providing the information needed for case management.

The following communications should be ongoing:

a. Progress reports on the system's design. Major changes should never be "sprung" on staff.

b. Written documentation of the system's operation.

c. Detailed training and retraining, if necessary, in input preparation, data flow and output interpretation.

d. Formal and informal feedback mechanisms through which staff suggestions may be incorporated into the system. Those who feel they have contributed to the system's design will have a vested interest in its success.

4. Keep the System Simple, Practical and Flexible

Reports that cannot be understood, which contain too much information or are not timely, will not be used and are, therefore, meaningless. Forms which are complicated, non-self-explanatory and seemingly irrelevant to the worker will be completed incorrectly or inaccurately, if at all. Data which accumulate beyond the agency's capacity to aggregate and analyze them are worthless. If the MIS is to be understood, accepted, useful and manageable, it must be practical from both the users' and processor's perspectives. Strategies for maintaining simplicity and practicality follow.

a. Determine the optimal reporting frequency of the information in the system. Doing so may lead to a distinction between information which must be readily accessible at all times, i.e., collected and reported routinely, and information which may be recorded and maintained in case records, then extracted periodically for special studies.

b. Poll report users periodically, asking, "What information is utilized? What is not clear? What additional information is desired?"

c. Strive for multi-purpose, rather than MIS-specific forms. Forms should be designed for ease of completion and should be pre-tested.

d. Avoid duplication in recording whenever possible.

e. Always be realistic in relation to agency resources.

Priorities change, external requirements change, technology changes. As such, the MIS must be flexible and modifiable. System components should never be regarded as "finished." Changes need not be drastic, however. In fact, data should be collected in similar formats long enough to permit comparisons over time.

A system which relies upon a data base is highly flexible. With a data base, non-aggregated data are stored centrally. Information is easily accessible and may be retrieved in a variety of formats and for various time periods.

5. Design and Implement Incrementally

Attempting to simultaneously design and implement all aspects of the system can be immobilizing and frustrating. The system should be phased in. To do so, identify required components and prioritize each. Then, prepare a realistic implementation plan, including a timeline and reachable goals. Start with something relatively small and simple so that progress can be seen early on. After all, the short-term pay-offs of an MIS are relatively few.

6. Replace Outmoded Systems

A new system is designed, in part, to replace inefficient methods. Once it is determined that this objective has been realized, the former systems should be discarded, regardless of how comfortable staff have become in their use. New requirements are more likely to be accepted if they replace existing procedures rather than add to the workload.

UNEXPECTED RESULTS

The expected results of MIS design include meaningful, management reports, efficient data and information flow and streamlined paperwork. It has been found that the design process itself can be rewarding. Cobb (1977, p. 107) states:

> ...the discipline required to translate information needs into a system can lead to an increase in clarity regarding both the nature of the management service program decisions that must be made and the consequences of having needed information, and thus the process itself can be of assistance to management.

Quinn (1976) reported that the process of computerizing a human services network information system resulted in the clarification of organization goals, decision criteria and organizational relationships. In addition, the new system imposed a common language among users, thus the potential for a unified evaluation system became more viable.

The process of developing an MIS at the Benjamin Rose Institute has led to a similar sense of clarification.

MIS DESIGN: A PRACTICAL APPLICATION

The Benjamin Rose Institute provides a wide range of health and social services to the frail elderly, aged 60 or older, in Cleveland, Ohio. Within the Community and Family Services Division, the Institute utilizes a neighborhood based team approach of service delivery. A team consists of a Coordinator, a Masters level Social Worker, B.A.-level Social Workers, a registered nurse, a home health aide supervisor, home health aides and, perhaps a geriatric outreach worker. Teams are currently housed in four

sites, each with clerical assistance. In addition, the Institute operates a 175-bed skilled nursing facility. As one of its overall objectives, the Institute strives to serve as a model service agency, in which innovative services and programs may be tested and demonstrated for cost-effectiveness and serve as models for widespread replication.

Historically, the Institute services were coordinated through a Central, downtown office. In early 1979, the neighborhood model was fully operationalized. One service team was moved from the Central Office to an east side neighborhood; two other neighborhood sites, which, since 1972, had been on project status under the auspices of the Institute, were fully integrated into the Institute's system. As "service projects," these two offices had focused their services predominantly on elderly living in specified housing projects. As neighborhood offices of the Institute, their target areas were expanded to include the communities surrounding the housing projects. Each worker remaining at the Central Office was assigned service responsibility for a particular geographical area.

Prior to the formal decentralization of services, several distinct information systems had existed: a Central Office system and one at each of the service projects. There were differences in terminology, in recordkeeping documents and in client numbering and tracking systems. No agency-wide meaningful management reports were routinely produced. In short, there was little uniformity. The data needed to compare sites and to evaluate the effectiveness of the new service model were either not available or not readily retrievable. The development of a uniform, reliable system of tracking clients and services became a top priority of

Administration. An Institute staff member, a middle-manager, was assigned the responsibility of overseeing the project.

Before any technical design was begun, managers met to itemize the types of questions the desired MIS should address, if it were to be a useful tool for decision-making. General planning concerns related to service and staffing patterns for particular neighborhoods, the use of informal and formal support networks, the number and types of clients to be served, the amount of agency resources to be spent on clients and changes in client functioning vis-a-vis services received. More specifically, management felt that the MIS should capture data regarding clients, staff, process, outcome and cost. The subsystems required were client tracking, intake, client record, i.e., demographics and functioning, service and time reporting, an interface with the Institute's Evaluation Research Unit to assess outcome, and a Fiscal Interface to determine cost. The initial concern of Administration was the development of an accurate method of counting clients and tracking them through the Institute's service system.

Research staff were also consulted to determine the extent to which MIS documents were to satisfy Research needs. It was decided that, whereas the MIS was to support ongoing program evaluation, it was <u>not</u> to be designed around the specialized needs of applied research. For special studies, research tools would be developed apart from the MIS. This decision was probably critical to the eventual success of the system's design, as it simplified the system and led to forms which were straightforward and designed around the day-to-day needs of staff.

In late 1979, a consultant with experience in designing, implementing and monitoring a system in a similar environment, was hired to work with the Institute's project coordinator on the technical design. Through a series of meetings with the team coordinators and secretaries, the two designers were able to thoroughly analyze the existing methods. Differences in interpretation and definition were disclosed, along with inefficiencies and duplication of efforts.

The first step in obtaining an accurate client count and a uniform case tracking system was for all units to adopt a common definition of an open case: a client who had received service within six months. All case managers were instructed to review their cases and to immediately close those which did not meet this definition. Simultaneously, a Central Registry was established, to be maintained at the Central Office. Each open case at each site was issued a case number through the Central Office. From that point forward, notification of every case opened and of every change in status of current clients would be processed through the Central Office, and only one numbering system would be maintained. It was found that a form already in use could be used for the notification process. Procedures for controlling data flow among the sites were established. Team secretaries were to report case counts to Central Office monthly, as were the case managers at Central Office, who were not yet organized into teams. Since new forms were designed for this purpose, staff training sessions were imperative. Agency reports, including an Unduplicated Case Count, were designed, and by January 31, 1980, a workable case tracking system was in place.

In the midst of this process, the first in a series of meetings was held with all staff to introduce them to the consultant and to the concept

of a "management information system." The goals and objectives of the proposed system were reviewed and each required subsystem was outlined. Staff soon became accustomed to receiving memoranda and to attending MIS-related meetings and training sessions. This process is now on-going at the Institute.

The next phase was the development of a system to track Intake into the Community and Family Services Division. Intake at the Institute is a two-step process consisting of "inquiry" and "assessment." An inquiry is a request for service. If the Institute's eligibility criteria are met, the referent is assigned for an in-depth assessment. At intake meetings, staff review each assessment and determine whether or not to accept the case. The Institute subsystem of the MIS required procedures for tracking the number, types and disposition of inquiries, and the number and disposition of assessments at each site.

The design group, which, through changes in management structure, now included two additional management-level staff, drafted an Inquiry Form which was presented to all staff handling inquiries for their review and input. The form, which included coding of key variables such as source of inquiry, services requested and inquiry disposition, was modified, piloted, modified again and implemented in August, 1980. Assessment disposition codes were also developed and recorded on the In-Person Assessment Form. Simultaneously, a system of logging monthly inquiries and assessments was implemented. Clerical staff were responsible for tallying these logs and for forwarding monthly totals to Central Office where they were compiled into agency-wide reports. The implementation of the Intake System involved extensive staff training and issuing a written manual which included explicit definitions

of terms and codes, and instructions for forms completion and processing.

Important developments at about that time included the hiring of a full-time MIS Supervisor and a new Director of Social Services, who proved highly supportive of the MIS and became quickly immersed in its design. The MIS Supervisor had had experience working with human services information systems and in designing computerized medical records systems for hospitals. Through meetings with the consultant, members of the original design group and clerical staff, the MIS Supervisor soon became familar with the components of the Institute's information system. Inefficiencies in the new MIS, as well as in the old procedures sill in effect, became obvious. It was decided that since the new case tracking and Intake systems could be refined without requiring drastic changes, these would be polished before the design of the next subsystem of the MIS would begin. Refinements included eliminating a number of duplicate client index files, reducing the Central Registry information to the bare essentials, introducing multiple-copy forms, modifying the new Inquiry Form according to the suggestions of staff, reviewing and revising the formats and frequencies of the new management reports in relation to the express objective of the MIS (it seemed that since data were finally available, <u>every</u> item collected was being reported monthly), and updating the manual to document the entire MIS. Also, clerical staff were alleviated of the responsibility of aggregating intake logs. Instead, the actual logs were to be forwarded to MIS for centralized storage and processing, thus creating a centralized data base and reducing the probability for error by "eliminating the middleman."

A task force, representing clerical staff and all disciplines of service providers, as well as each site, was formed to assist with the next phases of MIS development. Objectives of this group were a) to define the informational needs of line staff as related to a multi-disciplinary team approach of service provision, b) to identify strengths and weaknesses of existing forms and procedures and c) to serve as a staff input and feedback network. Although Task Force members were surprised to discover the variances among sites, they gleaned many useful ideas through informal sharing in these meetings.

An Administrative Task Force was also formed to periodically review and detail the needs of various management levels. Each task force was chaired by the MIS Supervisor, met on an "as needed" basis, and dealt with similar issues. Through the efforts of both groups, the outside consultant was gradually phased out and the following tasks were accomplished within months:

a. The In-Person Assessment Form was thoroughly analyzed and redesigned to serve primarily as a case management tool, reflecting the multi-disciplinary service approach, and also to feed into the MIS data base. The new form was implemented in April, 1981, eliminating the need for various other forms and bringing into the system the data required to compile a comprehensive client profile.

b. The necessary components of the case record were defined in relation to worker, MIS and outcome evaluation needs.

c. Service categories were established and defined for a service reporting system targeted for January, 1982, implementation.

A critical element of the ongoing design process has been periodic meetings with top management to discuss progress, to review and, if necessary, to reprioritize the goals of the system, to review inputs and outputs and to modify the proposed implementation schedule. Through these meetings, Administrative commitment to the MIS has been retained and the system has developed according to the particular needs of the agency.

Results

Nearly two years following the first phase of MIS development, progress is quite evident. The methods of recording and reporting more accurately reflect and support the multi-disciplinary team approach of service provision, the required steps of the referral process are more clearly defined and forms and procedures have been streamlined. Staff have gradually become aware of the types of information now available and are more frequently asking for information. More importantly, they are generally able to receive the information they need. Staff seem comfortable with the changes and MIS terminology and procedures are now ingrained in the day-to-day operation of the agency. In addition, the MIS design has led to an awareness of the need to review and update related policies, such as recordkeeping and confidentiality.

Conclusion

The success of the MIS design at the Benjamin Rose Institute can be attributed to a number of factors. The MIS began as a top priority of Administration, and management support has been retained throughout, as evidenced by their providing the required and appropriate resources and personnel. The addition of a full-time staff person, dedicated

solely to coordinating and monitoring the system's development, has expedited the process. Timing was a critical factor, as a uniform system of recording and reporting was the next logical step following the introduction of the new service model. Required components were identified and prioritized, then developed incrementally. Staff have been involved from the beginning, and their suggestions are often incorporated into the system. The agency's information needs are continually reviewed and MIS components are revised or designed accordingly. Yet the system remains flexible and relatively simple. Raw data are filed centrally and are easily accessible and retrievable in a variety of formats.

MIS development at the Institute is by no means complete. Several components have yet to be implemented and those that have continue to undergo refinement in accordance with changing requirements and staff feedback. To date, the system is manual, but alternatives are being explored and, at minimum, client demographics will soon be automated. The information system at the Institute is well on its way to becoming an indispensable management tool.

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